

CLAIMS

What is claimed is:

1. A method in the purification of a crude titanium tetrachloride chlorinator discharge from the carbochlorination of titanium containing materials to minimize the loss of raw materials resulting from passivation of aluminum chloride and vanadium oxychloride, comprising:

(a) mixing into the crude titanium tetrachloride chlorinator discharge comprising vanadium chlorides and aluminum chloride:

- (1) a vanadium passivating agent to passivate the vanadium chlorides present and form in the discharge one or more easy-to-separate vanadium-containing compounds, and
- (2) an aluminum passivating agent to passivate the aluminum chloride present and form one or more easy-to-separate aluminum-containing compounds wherein the aluminum passivating agent is selected from the group consisting of water, water containing solutions, water containing mixtures, and carboxylic acids,

with the proviso that:

- (i) when, after mixing the vanadium passivating agent into the chlorinator discharge, titanium oxychloride is formed in the discharge, no aluminum passivating agent is mixed into the discharge; and
- (ii) when after mixing the vanadium passivating agent into the chlorinator discharge, no titanium oxychloride is formed in the discharge, mixing into the discharge an amount of aluminum passivating agent to passivate the aluminum chlorides and react with the titanium tetrachloride to form titanium oxychloride;

and

- (b) separating from titanium tetrachloride chlorinator discharge the easy-to-separate vanadium- and aluminum-

containing compounds to form a purified titanium tetrachloride.

2. The process of Claim 1 wherein the separation process is selected from the group consisting of flashing distillation, multi-stage
5 distillation, a solid-liquid separation process, filtration, and centrifugation.

3. The process of Claim 1 wherein the vanadium passivating agent and the aluminum passivating agent are mixed into the discharge essentially simultaneously.

4. The process of Claim 1 wherein the vanadium passivating
10 agent is mixed into the discharge before the aluminum passivating agent is mixed into the discharge stream.

5. The process of Claim 1 wherein the vanadium passivating agent is mixed into the discharge after the aluminum passivating agent is mixed into the discharge stream.

15 6. The process of Claim 1 wherein the vanadium passivating agent is mixed into the discharge in an amount sufficient to reduce the concentration of, but not eliminate the vanadium chlorides present.

7. The process of Claim 1 wherein the aluminum passivating agent is comprised of a purge containing products from the passivation of
20 vanadium chlorides taken from a process step following the separation step.

8. The process of Claim 1 wherein the addition of the vanadium passivating agent and the aluminum passivating agent are controlled by a process control method.

25 9. The process of Claim 1 wherein the vanadium passivating agent is an organic oil.

10. The process of Claim 1 wherein the vanadium passivating agent is a petroleum oil, an animal fat, a vegetable oil or a combination thereof

30 11. The process of Claim 1 wherein the vanadium passivating agent is a hydrogenated naphthenic oil.